WASHINGTON DEPARTMENT OF ECOLOGY

ENVIRONMENTAL ASSESSMENT PROGRAM

FRESHWATER MONITORING UNIT

STREAM DISCHARGE TECHNICAL NOTES

STATION ID: 19C060

STATION NAME: West Twin River

WATER YEAR: 2006

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Introduction

Watershed Description

The West Twin River station is a stand-alone, continuously recording gaging station that has been operating since June 2004 in Water Resource Inventory Area (WRIA) 19. Like the other two drainages within the Strait of Juan de Fuca complex (East Twin River and Deep Creek) , West Twin River is very dynamic and carries substantial loads of bed material and large woody debris during precipitation--driven storm events which typically occur from November through February. The basin geology is composed of Crescent Formation volcanic rock in the upper watershed, marine sedimentary rock in the lower watershed, and terraces of glacial deposits in the lower floodplain (ONF 2002).

Gage Location

The gaging station is located in Clallam County, Washington approximately 20 miles west of Port Angeles. The station is on the left bank approximately 0.2 miles upstream from the mouth.

Table 1. Basin Area and Legal Description

Drainage Area (square miles)	12.7
Latitude (degrees, minutes, seconds)	48 09 47
Longitude (degrees, minutes, seconds)	123 57 10

Table 2. Discharge Statistics.

Mean Annual Discharge (cfs)	21
Median Annual Discharge (cfs)	17
Maximum Daily Mean Discharge (cfs)	62
Minimum Daily Mean Discharge (cfs)	3.2
Maximum Instantaneous Discharge (cfs)	67
Minimum Instantaneous Discharge (cfs)	3.1
Discharge Equaled or Exceeded 10 % of Recorded Time (cfs)	44
Discharge Equaled or Exceeded 90 % of Recorded Time (cfs)	3.7
Number of Days Discharge is Greater Than Range of Ratings	80
Number of Days Discharge is Less Than Range of Ratings	0
Number of Un-Reported Days	92
Number of Days Qualified as Estimates	96
Number of Modeled Days	0

Note: Statistics displayed in Table 2 may not include values in which the predicted discharge exceeds the range of ratings.

Table 2 Discussion (Discharge Statistics)

The most significant circumstance related to predicted discharge for WY2006 was the large number of days (92) that were not included in the annual statistics calculations. Given that the vast majority of these days did not report during periods of higher discharge, all annual statistics will be lower than the actual values. The large number of missing days for the Water Year renders the annual statistics displayed above almost meaningless for inclusion in future trend analysis. During WY2006, a series of moderately large hydrologic events occurred throughout October and November 2005. A series of larger winter storms from late December through early February 2006 elevated discharge values at West Twin River. Two moderately large events in March and two smaller events in later spring were the only interruptions in the slow, steady decline to summer baseflow conditions.

Table 3. Error Analysis Summary.

Potential Logger Drift Error (% of discharge)	3.2
Potential Weighted Rating Error (% of discharge)	5.4
Total Potential Error (% of discharge)	8.6

Table 3 Discussion (Error Analysis)

Total Potential Error (TPE) is the cumulative value of the potential logger drift error and the potential weighed rating error. Error surrounding any predicted discharge value is acquired in a number of ways, ranging from variability in the quality of any particular discrete discharge measurement to the operational performance of a datalogger and the sonde measuring stage. Total Potential Error defines the expected range for any predicted discharge value. For example, if the TPE is 10.0 % and the predicted discharge value is 100 cfs, the range in which the actual predicted value lies is 90 to 110 cfs. For 55 of the recorded days, the agreement between the stage on the logger and discrete observations of the primary gage index met standards defining stable drift. Three days were quality coded as estimated due to logger drift error exceedances.

Table 4. Stage Record Summary

Minimum Recorded Stage (feet)	1.62
Maximum Recorded Stage (feet)	6.36
Range of Recorded Stage (feet)	4.74

Table 4 Discussion (Stage Record)

The gaging station was physically moved to a new location on October 12, 2005 rendering the stage record incomplete for WY2006. Three relatively large gaps in the stage data due to equipment and power supply failures were filled using regressed stage data from nearby gaging stations. During WY2006, discrepancies between the observed value of the primary gage index and the logged stage value were reconciled by manual adjustment of the continuous stage record.

Table 5. Rating Table Summary

Rating Table No.	4		
Period of Ratings	10/13-09/30		
Range of Ratings (cfs)	1.8-69		
No. of Defining Measurements	2		
Rating Error (%)	5.4		

Rating Table No.			
Period of Ratings			
Range of Ratings (cfs)			
No. of Defining Measurements			
Rating Error (%)			

Rating Table No.			
Period of Ratings			
Range of Ratings (cfs)			
No. of Defining Measurements			
Rating Error (%)			

Table 5 Discussion (Rating Tables)

Rating Table 4 predicts discharge for the period during which the station was moved to the second location. Only two discharge measurements were conducted during this period, making the rating minimally robust. For this reason, rating Table 4 is completely independent of other ratings and will not phase into rating Table 5. The circumstances described above for rating Table 4 reduced confidence in the rating during the quality assurance review process to the degree that the entire range of reported rating was quality coded as estimated.

Table 6. Model Summary

Model Type (Slope conveyance, other, none)	none
Range of Modeled Stage (feet)	
Range of Modeled Discharge (cfs)	
Valid Period for Model	
Model Confidence	

Table 6 Discussion (Modeled Data)

Table 7. Survey Type and Date (station, cross section, longitudinal)

Type	Date
Station	10/03/2006

Table 7 Discussion (Surveys)

This survey was rendered somewhat moot by severe station damage sustained during WY2006. The new location has proven to be vulnerable to high flows and bank erosion.

Activities Completed

Turbidity monitoring was initiated in WY2006. In all likelihood, the station will have to be physically moved again to a more secure, stable, and safe location.